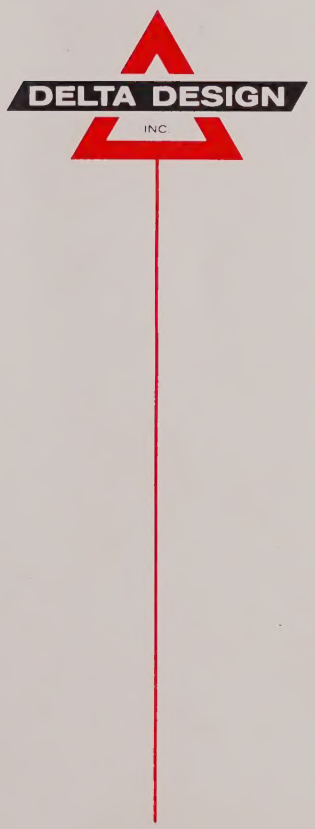
DELTAGUARD



SAN DIEGO, CALIFORNIA

DELTAGUARD

DELTA DESIGN INC

5725 KEARNY VILLA ROAD, SAN DIEGO, CALIFORNIA - TEL (714) 292-5000 - TWX: (910) 335-1215 - CABLE: DELTA

DELTA DESIGN, INC.
5725 Kearny Villa Road
San Diego, California 92123

MK 9400 DELTAGUARD
OPERATING INSTRUCTIONS

INTRODUCTION:

The DeltaGuard is a device that operates in conjunction with a Delta Design Type III Controller. It automatically turns off a temperature chamber and sounds an alarm if the temperature control is lost. This feature can be used to advantage in low temperature tests inasmuch as running out of LCO_2 results in a FAILURE indication. The DeltaGuard then signals the need for a new bottle of coolant.

The DeltaGuard uses the "null contacts" provided on the Type III Controller. These "null contacts" close only when the chamber temperature is correct. Any control failure causes a deviation of temperature control which causes the "null contacts" to open. This trips the DeltaGuard, which shuts off the chamber power, lights the red FAILURE LAMP, and sounds a buzzer to attract attention.

OPERATING INSTRUCTIONS:

1. Connect the "null contact" terminals (rear of Delta-Guard to the null contact terminals on the rear of the Delta MK III chamber.
2. Turn all switches on the chamber and DeltaGuard to their OFF positions and connect the power cord of the chamber to the rear of the DeltaGuard power receptacle. Plug the DeltaGuard into a source of power.
3. Place the Power Switch of the DeltaGuard to STANDBY and the audio switch as desired.
4. Turn the chamber ON and select the desired temperature utilizing normal procedure.
5. Place the DeltaGuard Power Switch to ON.

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NOTE: Anytime the DeltaGuard trips to its Alarm (FAILURE) condition, it can be reset by pressing the RESET button. The Buzzer can be silenced by placing the audio switch to SILENCE.

COOLANT AUTOMATIC TURN OFF PROTECTION:
Automatic turn off of coolant is obtained by inserting a second or "safety" valve in series with the supply line of coolant. Power for the safety valve solenoid is derived by connecting a junction box into the "load receptacle" J1 on the rear of the DeltaGuard and connecting both the chamber power cord and the safety valve solenoid coil to the junction box.

The DeltaGuard removes power from the chamber and shuts off the supply of liquid coolant in this application.

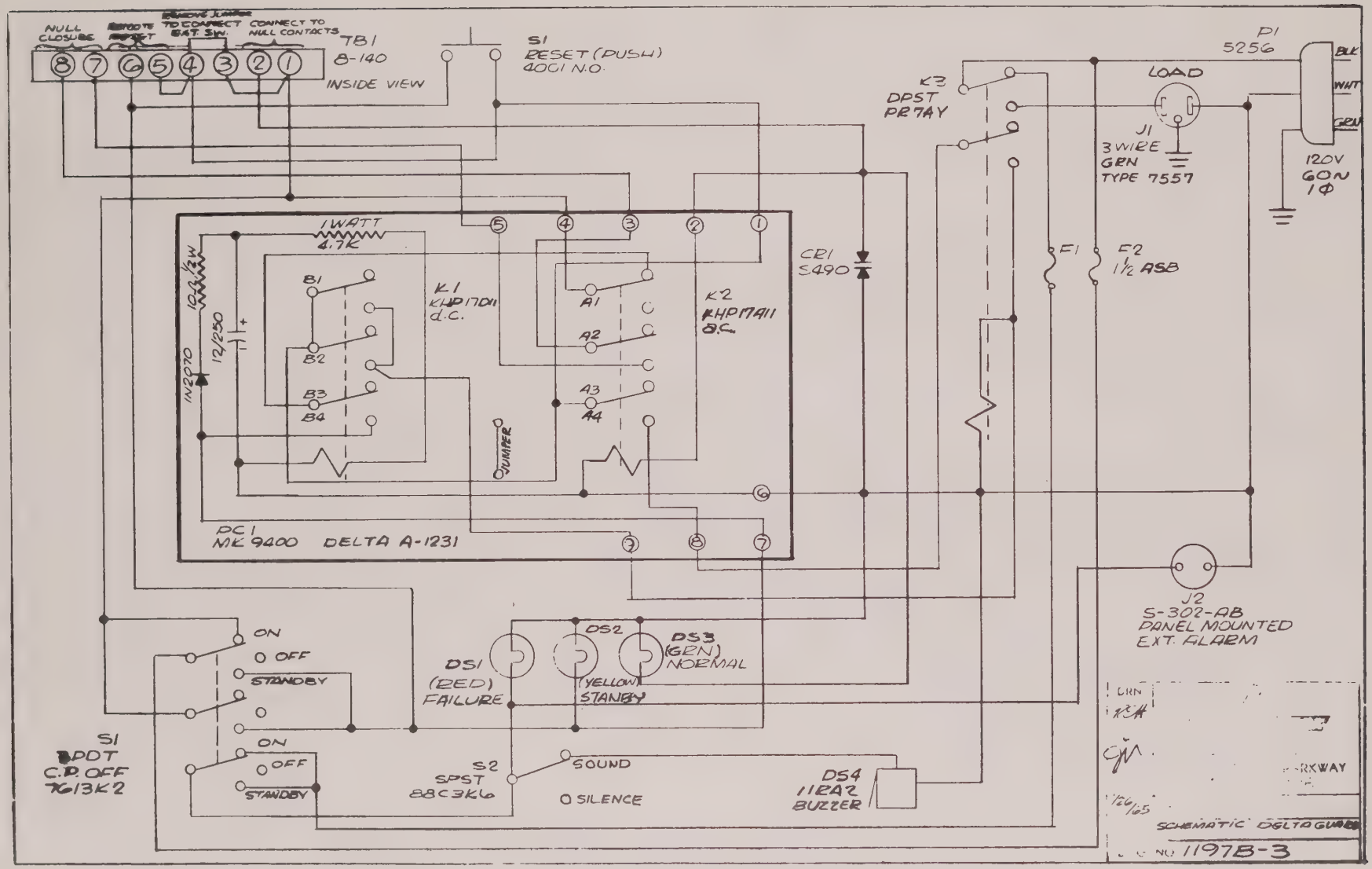
EXTERNAL RESET:
The DeltaGuard can be remotely reset by momentarily making a connection between terminals 5 and 6 (labeled REMOTE RESET). An isolated circuit must be used to perform this function as there is voltage on these terminals with respect to the chassis.

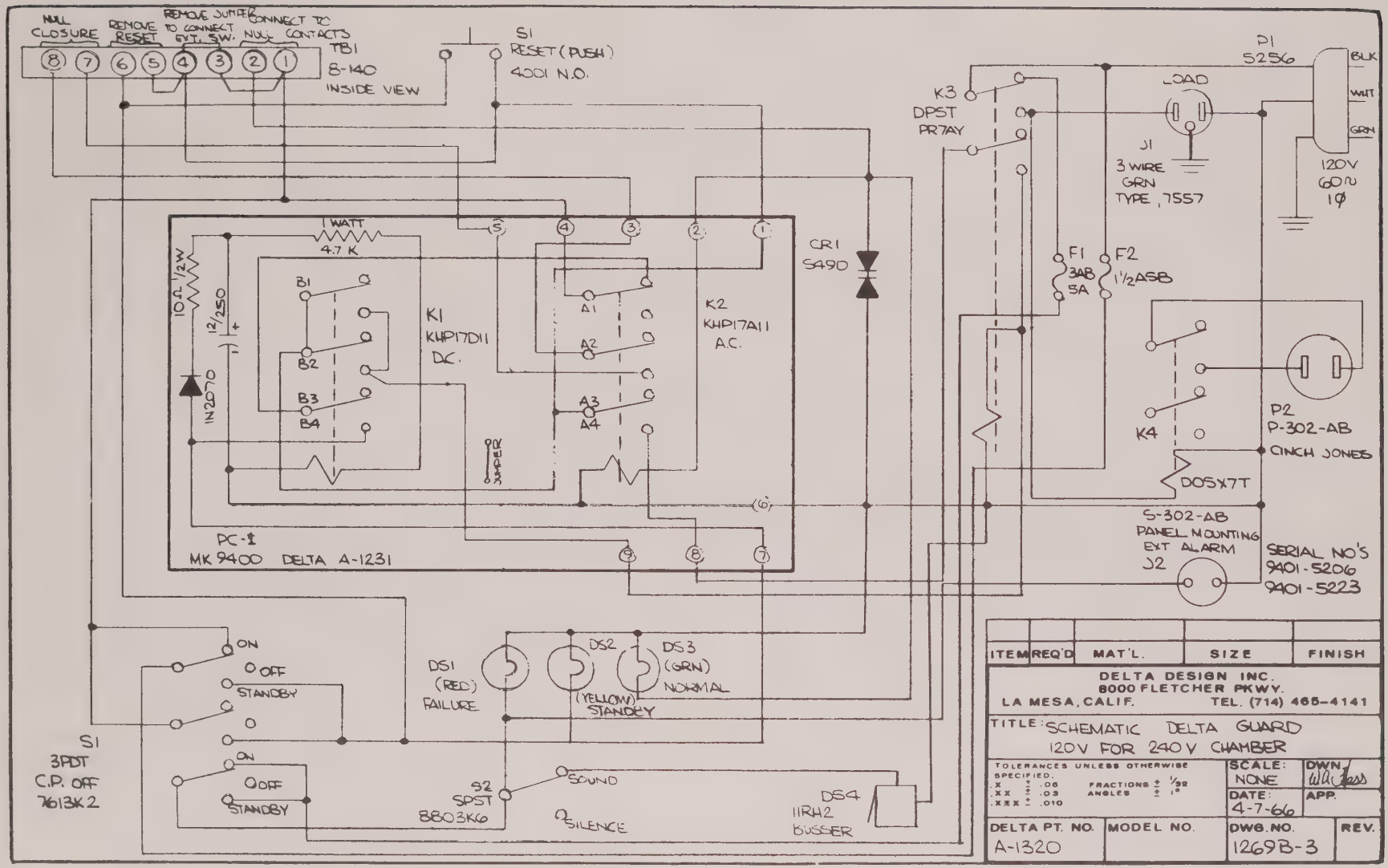
EXTERNAL FAILSAFE (Automatic Chamber Shut-Off):
An external failsafe or turn off device (timer actuated switch) can be connected to the DeltaGuard by removing the jumper connecting pins 3 and 4 of the terminal board of the DeltaGuard. Connect a set of normally closed isolated contacts between terminals 3 and 4. A momentary interruption of the circuit results in tripping the DeltaGuard to FAILURE and, consequently, complete system shut off.

THEORY OF OPERATION:
The DeltaGuard is basically a power relay switching system with a relay coil connected through its own holding contacts. The null contacts of the Type III controller cause the power relay "drop out" if they open. These controller "null contacts" close

only if the controller is at set temperature and operating properly.

A "standby" logic circuit is included in the DeltaGuard to allow the chamber to initially heat up or cool down. This is necessary because during the heating up or cooling down of the chamber, the controller is not at null and the null contacts are open. The null contacts close and the "standby circuit" de-energizes when the chamber reaches the temperature set on the controller. The DeltaGuard automatically switches to NORMAL mode of operation when the null contacts close. An opening of the null contacts after the DeltaGuard has switched to NORMAL mode of operation is an indication of control failure and results in system shut down.


NULL CLOSURE
REMOTE RESET
Shorting Jumper TO DISCONNECT BAT. SW.
CONNECT TO NULL CONTACTS
TB1
8-140
INSIDE VIEW
S1
RESET (PUSH)
400Ω N.O.
P1
5256
BLK
WHT
GRN
LOAD
K3
DPST
PR7AY
J1
3 WIRE
GRN
TYPE 7557
120V
60N
1Φ
1 WATT
4.7K
124 1/2W
12/250
IN2070
B1
B2
B3
B4
K1
KHP17011
d.c.
A1
A2
A3
A4
K2
KHPM411
D.C.
JUMPER
CR1
S490
F1
F2
1½ ASB
PC1
MK 9400 DELTA A-1231
J2
S-302-AB
PANEL MOUNTED
EXT. ALARM
ON
OFF
STANDBY
S1
DPDT
C.P. OFF
7G13K2
DS1
(RED)
FAILURE
DS2
(YELLOW)
STANBY
DS3
(GRN)
NORMAL
S2
SPST
88C3K6
SOUND
SILENCE
DS4
11BA2
BUZZER
SCHEMATIC DELTA GUARD
NO 1197B-3



ITEM	REQ'D	MAT'L.	SIZE	FINISH

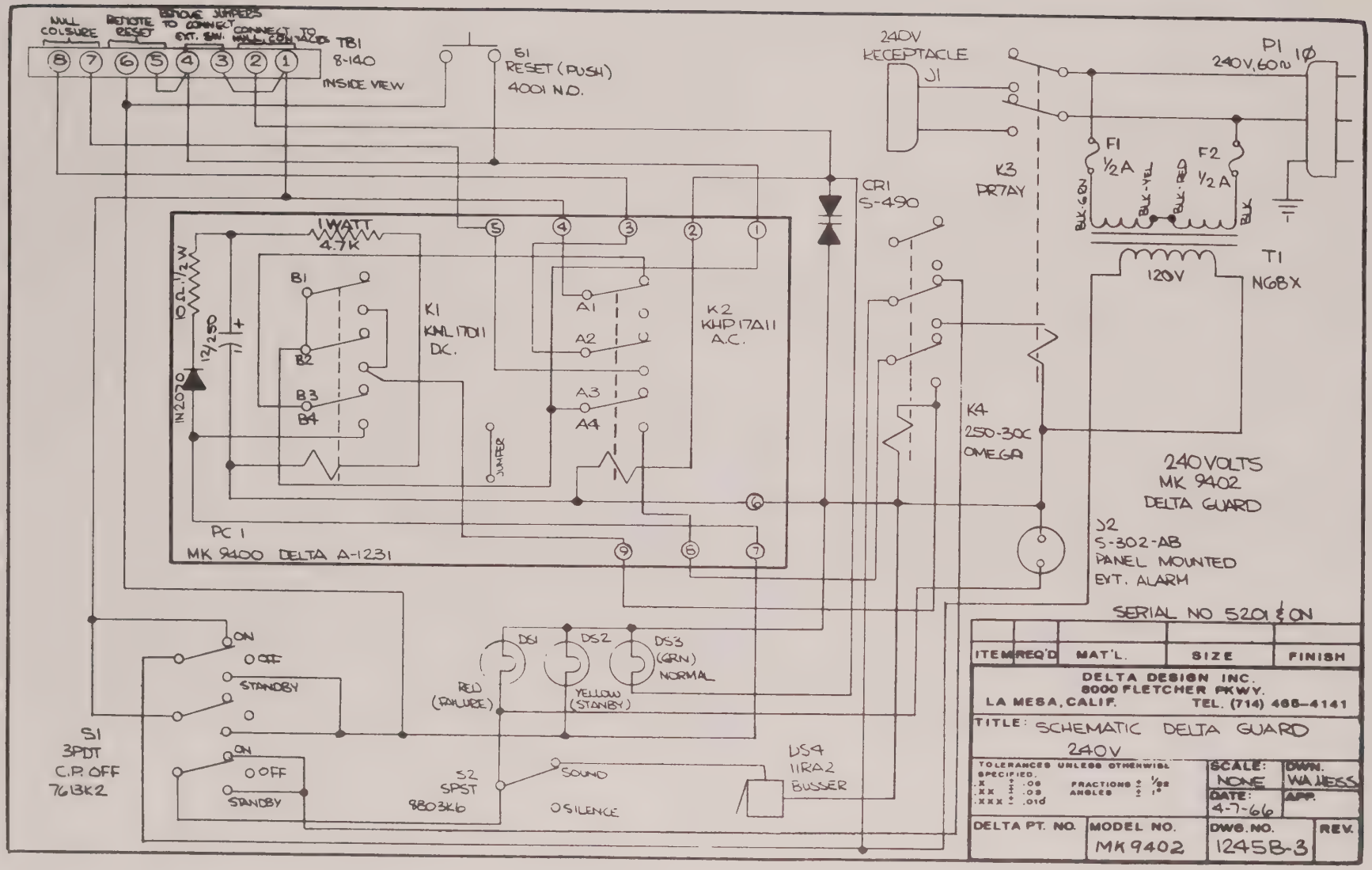
DELTA DESIGN INC.
8000 FLETCHER PKWY.
LA MESA, CALIF. TEL. (714) 466-4141

TITLE: SCHEMATIC DELTA GUARD
120V FOR 240V CHAMBER

TOLERANCES UNLESS OTHERWISE SPECIFIED:
.X ± .06
.XX ± .03
.XXX ± .010
FRACTIONS ± 1/32
ANGLES ± 1°

SCALE: NONE
DWN. WLC Bass
DATE: 4-7-66
APP.

DELTA PT. NO.	MODEL NO.	DWG. NO.	REV.
A-1320		1269B-3	


WALL COLSURE
REMOTE RESET
REMOVE JUMPERS TO CONNECT EXT. SW.
CONNECT TO WALL COLSURE
TB1
8-140
INSIDE VIEW
S1
RESET (PUSH)
4001 N.O.
240V RECEPTACLE
J1
P1
240V, 60~ 1Ø
F1
½A
F2
½A
K3
PR7AY
CR1
S-490
T1
N68X
120V
1 WATT
4.7K
10Ω, ½ W
12/25D
IN2070
B1
B2
B3
B4
K1
KNL1701
DC.
A1
A2
A3
A4
K2
KHP17A11
A.C.
JUMPER
K4
250-30C
OMEGA
PC 1
MK 9400 DELTA A-1231
240 VOLTS
MK 9402
DELTA GUARD
J2
S-302-AB
PANEL MOUNTED
EXT. ALARM
SERIAL NO 5201 & ON
ON
OFF
STANDBY
S1
3PDT
C.P. OFF
763K2
DS1
DS2
DS3
(GRN)
NORMAL
RED
(FAILURE)
YELLOW
(STANBY)
DS4
11RA2
BUSSER
S2
SPST
8803K6
SOUND
SILENCE
ITEM
REQ'D
MAT'L.
SIZE
FINISH
DELTA DESIGN INC.
8000 FLETCHER PKWY.
LA MESA, CALIF.
TEL. (714) 466-4141
TITLE: SCHEMATIC DELTA GUARD 240V
TOLERANCES UNLESS OTHERWISE SPECIFIED.
.X ± .06
.XX ± .03
.XXX ± .010
FRACTIONS ± 1/32
ANGLES ± 1°
SCALE: NONE
DWN. WA HESS
DATE: 4-7-66
APP.
DELTA PT. NO.
MODEL NO. MK 9402
DWG. NO. 1245B-3
REV.

PARTS LIST

120V MK 9401/9401R
240V MK 9402/9402R

DWG. NO. 1197A-4

SHT. 1 OF 2

TITLE DELTAGUARD MK 9400 PARTS LIST

TYPE THROUGH

DELTA DESIGN, INC. LA MESA, CALIF.

DASH NO.	REF. DES.	NO. REQ.	DESCRIPTION	COM'L. PT. NO.	MF'R.	DELTA PT. NO.	
1			Sales Outline				
2			Fabrication Parts List				
3			Schematic				
4			Parts List				
5			Wiring Schedule				N/D
6			Wiring Diagram				N/D
7			Electro-Mech. Assy				N/D
8	CR1	1	Contact Protector	S 490	Sarkes Tarzian	K-2501	
9	DS1	1	Indicator Lamp Assy	Yellow	Sylvania	A-1016	
10	DS2	1	Indicator Lamp Assy	Green	Sylvania	A-1015	
11	DS3	1	Indicator Lamp Assy	Red	Sylvania	A-1014	
12	DS4	1	Buzzer Alarm 115VAC	11RA2		A-1203	
13	F1	1	Fuse 1½ ASB	3AB 1½ASB	Littlefuse	A-1220	
14	F2	1	Fuse 1½ ASB	3AB 1½ASB	Littlefuse		
* 15	J1	1	Connector, Power Female 3 wire, Grd. Type, Flush	7557	Hubbell		
16	J2	1	Connector, Panel Mounted 2 Pin Female	S-302-AB	Cinch Jones	A-1088	
17	K1	1	Relay, 4 PDT	KHP17D11	Potter Brumfield	A-1239	
18	K2	1	Relay, 4 PDT	KHP17A11	"	A-1238	
19	K3	1	Relay DPDT	PR7AY	"	A-1179	
* 20	P1	1	Plug, Power 3 Pin	5256	Hubbell		
21	S1	1	N.O. Push Button Switch	4001 N.O	Grayhill	A-1219	
22	S2	1	Switch 3 PDT, Center Pos. OFF	7613K2	Cutler Hammer	K-2207	
23	S3	1	Switch SPST	8803K6	"	K-2201	

Used with MK 9401/MK 9401R

PARTS LIST

DWG. NO. 1197A-4

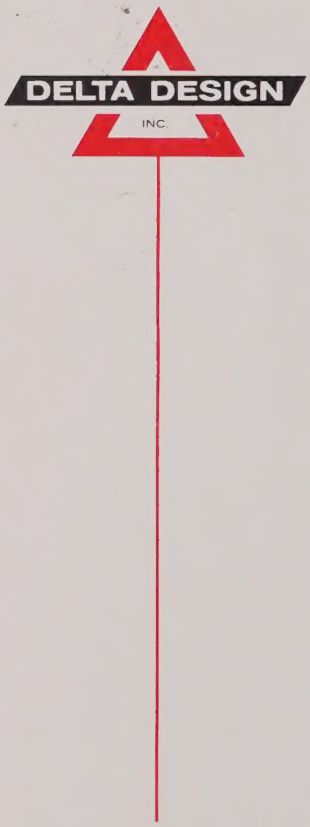
SHT. 2 OF 2

TITLE DELTAGUARD MK 9400 TYPE 120V MK 9401/9401R/ 240V 9402/9402R THROUGH

DELTA DESIGN, INC. LA MESA, CALIF.

DASH NO.	REF. DES.	NO. REQ.	DESCRIPTION	COM'L. PT. NO.	MF'R.	DELTA PT. NO.
24	TB1	1	Terminal Strip 8 pin	8-140Y	Cinch Jones	A-1221
25		1	12 Gauge Power Cord #12-50		Delta Design	A-1054
26		1	Mounting Nut	7C-1040	Grayhill	
27	XF1	1	Fuseholder	342012	Littlefuse	K-1501
28	XF2	1	Fuseholder	342-12	Littlefuse	K-1501
29		4	Mounting Feet, Grey Rubber		Alantic India Co.	A-1134
30		1	Grommet	8P1	Heyco	
31		14	Screws, Phillips #6-32x½ Pan.Hd.			
32		16	#4-40 Swage Nuts			
33		6	N/P #6-32 x 3/8 Pan.Hd.			
34		8	#6-32 Nut			
35		8	#6 Lockwashers			
36		12	#4-40 x 3/8L oval hd. Phil. Nickel Plated			
37		4	#4-40 x 3/8L Flat Head Phil. Nickel Plated			
38		6	#6 Washers, Plain N/P			
39		12	#6-32 Swage Nuts			
**			Female Twistlock Connector, Power,	7328	Hubbel	
**			Transformer, Step Down 240 to 120VAC	N68X	Triad	
**			Plug, Power Twistlock	9965	Hubbell	

** USED WITH MK 9402/MK9402R



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